

REMARKS

I. Information Disclosure Statement

According to the Office Action, it is requested that item Y, AA, AG, and AH be submitted. In response, enclosed is another Information Disclosure Statement (IDS) including copies of items Y, AG, and AH. Applicant is still in the process of locating item AA.

II. Objections to the Drawing and Specification

According to the Office Action, the drawings are objected to because Figures 2 and 3 are inconsistent with the Specification. Specifically, it is alleged that the statement on page 7, line 7 of “step 208, the user selects the schematic configuration of the proposed circuit” is inconsistent with element 208 shown in Figure 2 stating “select circuit configuration”. In response, the drawings are amended so that element 208 in Figure 2 reads “select schematic configuration.”

According to the Office Action, the abstract of the disclosure is objected to because it is more than 150 words. For the following reasons, this objection is respectfully traversed. The current abstract has 198 words. This is within the 250 word limit for an abstract which was effective at the time the instant patent application. The 150 word limit became effective after the filing of the instant patent application, and therefore does not apply to this application.

According to the Office Action, the specification and the drawings are objected because it is alleged that the statement on page 8, line 10 of “step 306 . . . stores the scalar values of the desired vector measurements” is inconsistent with the element 306 shown in Figure 3 stating “store vector measurements.” In addition, it is alleged that it is unclear what is meant by a scalar value of a vector measurement.

For the following reasons, this objection to the specification and drawings is respectfully traversed. There is nothing in the pertinent statute, rules, or MPEP that requires the language in

the specification to have a one-to-one correspondence with the language used in the drawings. Rather, the requirements based on 35 U.S.C. 112 is that the written description of the invention which includes specification and drawings should be written in a manner as to enable one skilled in the relevant art to make and use the invention.

In this case, the recitation of the steps performed by the simulation template is abbreviated in Figure 3 to be concise, and a more detailed explanation provided in the specification. Those skilled in the relevant art of circuit simulation would appreciate that the phrase "store vector measurements" as used in Figure 3 is a short version of stating "stores the scalar values of the desired vector measurements."

As to the allegations that the statement "a scalar value of a vector measurement" is unclear, this objection is also respectfully traversed. It is well known that a scalar is a one dimensional parameter, such as the root mean square (RMS) of an alternating voltage. Whereas, a vector is a multiple dimensional parameter typically having a magnitude and direction associated with it, such as a voltage alternating with a particular phase angle relative to a reference phase angle. In the specification on page 9, lines 18, an example of a scalar value is given as being a mean value of a voltage. Thus, the discussion of a scalar value of a vector measurement is sufficient discussion as to enable one skilled in the relevant art.

According to the Office Action, it is alleged that the "sensitivity" as defined in the specification is inconsistent with the generally accepted meaning of "sensitivity." More specifically, the specification states on page 8, lines 8-10 that the "sensitivity is the vector measurement calculated when a parameter value is varied from nominal minus the vector measurement when the parameter value is nominal." In the Office Action, an article by Tucker is cited to alleged that the generally accepted meaning of a "rate of change." This objection is respectfully traversed.

First, it is submitted that the statements made regarding “sensitivity” in the specification is not inconsistent with the “rate of change” definition. In order to determine a rate of change, a parameter is varied several times and measurements are taken each time. This is basically what has been stated in the specification. Specifically, to determine a rate of change, a vector measurement (V_1) is made when a parameter is varied from nominal minus the vector measurement (V_2) when the parameter is nominal. Thus, vector measurement V_1 minus vector measurement V_2 gives an indication of a rate of change. Second, a sensitivity analysis is very common in the relevant art of circuit simulation, and well understood by those skilled in the art. Thus, the definition of sensitivity need not even be required to be put forth in the specification. Finally, it is well known in Patent Law that an Applicant can be its own lexicographer and define there is it wishes.

According to the Office Action, it is alleged that the equation appears incorrect. In response, the specification is amended to rewrite the equation such that the square is outside of the parenthesis encompassing $V_{\text{result}}(\text{param}) - V_{\text{result}}(\text{nominal})$.

According to the Office Action, the specification on page 13, line 27 because of the use of “scalar measurement” in the phrase “a reference simulation is run and selected scalar measurement save.” As discussed above, one skilled in the art would understand the meaning of a “scalar measurement”.

According to the Office Action, the specification on page 13, line 28 is objected to for the statement “the absolute value of the difference measurements are summed and saved. The reason for the objection is that it is alleged that it is not clear what difference measurements are summed. The “difference measurements” is referring to the sensitivity analysis stated in the previous paragraph. As previously discussed in the specification, the sensitivity is the vector measurement calculated when a parameter value is varied from nominal minus the vector

measurement calculated when a parameter value is nominal. In mathematics, the word "minus" typically denotes a difference measurement.

III. Specification Objection Incorporation of External Material

According to the Office Action, the application referred to on page 7, line 12, has matured into U.S. Patent 6,230,305. Accordingly, the specification is amended to add the reference to the Patent.

IV. Claim Rejections - 35 U.S.C. 112, first paragraph - Enablement

According to the Office Action, claims 1 and 5 stand rejected under 35 U.S.C. 112, first paragraph, for allegedly containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention.

More specifically, it is alleged that the perturbing routines as stated in claim 1 is enabling only with respect to sensitivity, RSS, EVA, and WCS, and not for all other perturbing routines. This rejection is respectfully traversed. A perturbing routine means any routine that varies circuit parameters in a particular way. Such perturbing routine should not be interpreted as to only encompass the example analysis provided in the specification, i.e. the sensitivity, RSS, EVA, and WCS. There are many other types of analysis that can be performed using the perturbing routine of the invention, which are well within the scope of the invention. The invention relates to a method of automatically modifying a netlist using templates to provide previously unavailable analysis. It is not limited to those examples given. It is well within the purview of those skilled in the art to employ the template modifying netlist technique on other types of perturbing routines.

In addition, it is alleged that the analysis routines as stated in claim 1 is enabling only with respect to sensitivity, RSS, EVA, and WCS, and not for all other perturbing routines. For the reasons given above, this rejection is also traversed.

Furthermore, it is alleged that the pre-determined routines as stated in claim 5 is enabling only with respect to sensitivity, RSS, EVA, and WCS, and not for all other perturbing routines. For the reasons given above, this rejection is also traversed.

Additionally, it is alleged that the language in claim 7 of "root summed square analysis involving a sum of the square of said difference between" is unclear because the equation in the specification does not square the sensitivity. The equation has been corrected in the specification, and root summed square (RSS) analysis and its equation is well in the art.

Also, claim 9 is rejected because of the language "absolute value of said difference." This rejection is respectfully traversed. As discussed above, and stated in claim 6, the sensitivity analysis involves determining a difference between said respective selected vector measurements and said nominal selected vector measurement. Thus, it is sufficiently clear to one skilled in the art.

With regard to the allegation that claim 9 confuses (and mixes) "extreme value analysis" with Beyer's mean deviation, the Undersigned Attorney respectfully has no clue in what the Examiner means. Claim 9 is what claim 9 says. It does not use "extreme value analysis" and does not refer to Beyer's mean deviation.

V. Claim Rejections - 35 U.S.C. 112, second paragraph - Indefinite

According to the Office Action, claims 1, 5, 7, 8, and 9 stand rejected under 35 U.S.C. 112, second paragraph, for allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. In particular, it is alleged that claim 5 is not clear because of the phrase "manipulates said nominal selected vector measurement in accordance with said pre-determined analysis." In response, claim 5 is amended to delete the word "nominal." In addition, it is alleged that claim 7, 8, and 9 it is unclear because of the use of

nominal selected vector measurement. As previously discussed, the word “nominal” has been deleted from claim 5, therefore claims 7, 8, and 9 are now clear.

Also, it is alleged that the phrase in claim 9 of “worst case by sensitivity analysis involving a maximum of an absolute value of said difference” is unclear because of its use of difference measurements. Claim 9 is dependent on claim 6 which defines the “difference between said respective selected vector measurements and said nominal selected vector measurement.”

VI. Claim Rejections 35 U.S.C. 103

According to the Office Action, claims 1-20 stand rejected under 35 U.S.C. 103(a) in view of U.S. Patent No. 5,278,769 issued to Bair in view of legal precedent and other references. More specifically, claims 1, 2, 4 and 5 stand rejected 35 U.S.C. 103(a) in view of the Bair Patent and legal precedent of automation. Claim 3 stands rejected under 35 U.S.C. 103(a) in view of the Bair Patent, legal precedent (automation) and legal precedent of eliminating elements. Claims 6, 7, and 8 stand rejected under 35 U.S.C. 103(a) in view of the Bair Patent, legal precedent (automation), and the Tucker reference. And, claim 7 stands rejected under 35 U.S.C. 103(a) in view of the Bair Patent, legal precedent (automation), the Tucker reference, and the Beyer reference.

For the following reasons, this rejection of claims 1-20 is respectfully traversed. The invention relates to a computer program and method of modifying a netlist to provide additional circuit analysis involving a perturbing routine where circuit parameters are periodically altered, a simulation routine where circuit simulations are run for each circuit parameter being varied, and an analysis routine to perform a specified analysis on the results of the circuit simulations.

A netlist is typically used to simulate a netlist where the circuit parameters are at nominal values. To analyze the response of the circuit to varying circuit parameters, typically designers

perform a manual change of the circuit parameter in the netlist and then run another simulation. This manual change of the netlist to ascertain the response of the circuit to varying parameters is time-consuming, labor-intensive, complex, and expensive.

Thus, the invention solves this problem by providing a software program, such as an interactive command language (ICL) script, that modifies a netlist in a manner that when the netlist is simulated, it performs a perturbing routine to vary circuit parameters, a simulation routine for each variation of a circuit parameter, and an analysis routine to perform a specified analysis on the results of the circuit simulations. For example, with regard to the perturbing routine, the software program modifies a netlist to add one or more loops to vary circuit parameters in a particular way. With regard to circuit simulation, the software program modifies the netlist to add a simulation command within the one or more loops so that a circuit simulation occurs when a parameter is varied. Finally, with regard to the analysis routine, the software program modifies the netlist to add one or more predetermined analyzes of the results of all the circuit simulations. Such elements of the claims are neither described nor suggested in the cited references.

Aside from the fact that the Bair Patent is in the circuit simulation field, it has relatively little bearing on the invention as claimed. The Bair Patent describes a circuit simulation software program which analyzes circuit at different levels of extraction. For instance, the Bair program analyzes circuits at the gate- or logic-level (see col. 8, line 65 to col. 9, line 1), at the circuit- or transistor-level (see col. 9, lines 5-10), at the delay-or timing-level (see col. 9, lines 11-20), at the layout level (see col. 9, lines 26-31), and at the switching-level (where transistors are modeled as switches) (see col. 10, lines 38-43). The Bair Patent summarizes its analysis program by stating:

By creating a number of different models at different levels (e.g. circuit-level, switch-level, and logic level) more opportunities are created for model verification. The greater the number of comparisons performed by the auto-verification process, and the greater the

agreement between the corresponding simulations, the greater is the confidence level that the models will perform accurately and repeatedly. (col. 10, lines 18-25).

There is no discussion in the Bair Patent related to the elements in the claims of a computer program and method of modifying a netlist to provide additional circuit analysis involving a perturbing routine where circuit parameters are periodically altered, a simulation routine where circuit simulations are run for each circuit parameter being varied, and an analysis routine to perform a specified analysis on the results of the circuit simulations.

In the Office Action, it is alleged that the Bair Patent teaches the first element of claims 1 and 9 of “adding a perturbing routine to said netlist for altering circuit parameter values of said circuit design in a pre-determined manner”, citing col. 3, line 10. That statement merely states that the “circuit-level simulation is run under several different simulated conditions of power supply voltage and temperature to determine worst and best case delay characteristics, rise and fall times.” However, the Bair Patent fails to elaborate how the circuit-level simulations are run. It does not teach a computer program (script) to modify a netlist to add a perturbing routine so that circuit parameters are varied in pre-determined manner.

Also in the Office Action, it is alleged that the Bair Patent teaches the second element of claims 1 and 9 of “adding a simulation routine to said netlist for performing simulations of said circuit for respective altered parameter values to arrive at respective selected vector measurements”, citing col. 3, line 10. Again, that statement merely states that the “circuit-level simulation is run under several different simulated conditions of power supply voltage and temperature to determine worst and best case delay characteristics, rise and fall times.” The Bair Patent fails to elaborate how the circuit-level simulations are run. It does not teach a computer program (script) to modify a netlist to add a simulation routine to perform simulations for each altered circuit parameter.

Also in the Office Action, it is alleged that the Bair Patent teaches the third element of claims 1 and 9 of “adding an analysis routine to said netlist for manipulating at least one of said vector in accordance with said pre-determined analysis”, citing col. 3, line 10. Again, that statement merely states that the “circuit-level simulation is run under several different simulated conditions of power supply voltage and temperature to determine worst and best case delay characteristics, rise and fall times.” The Bair Patent fails to elaborate how the results of the circuit-level simulations are analyzed. It does not teach a computer program (script) to modify a netlist to add an analysis routine to analyze the results of the various simulations.

In the Office Action, the rejections also cite legal precedence in connection with the Bair Patent. It is assumed that legal precedence is taking official notice of certain elements. It is respectfully requested that a reference is cited for each official notice relied upon if issued in a subsequent office action. The remaining references, namely the Tucker and Beyer references, are general discussion on computer science and mathematics, and have little bearing on the methodology of the invention.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend claim 5 as follows:

1 1. (Original) A method of modifying a SPICE netlist of a circuit design using a
2 simulation template to perform a pre-determined analysis involving circuit parameterer
3 perturbations, comprising:

4 adding a perturbing routine to said netlist for altering circuit parameter values of said
5 circuit design in a pre-determined manner;

6 adding a simulation routine to said netlist for performing simulations of said circuit
7 desing for respective altered circuit parameter values to arrive at respective selected vector
8 measurements; and

9 adding an analysis routine to said netlist for manipulating at least one of said vector
10 measurements in accordance with said pre-determined analysis.

1 2. (Original) The method of claim 1, further including the step of adding tolerances
2 in the netlist for said circuit parameters.

1 3. (Original) The method of claim 1, further including the step of removing
2 parameter and vector save statements in said netlist.

1 4. (Original) The method of claim 1, further including the step of adding a routine
2 to said netlist to perform a reference simulation of said netlist to arrive at a nominal value for
3 said selected vector measurement.

1 5. (Currently Amended) The method of claim 4, wherein said analysis routine also
2 manipulates said ~~nominal~~ selected vector measurement in accordance with said pre-determined
3 analysis.

1 6. (Original) The method of claim 5, wherein said pre-determined analysis includes
2 a sensitivity analysis involving determining a difference between said respective selected vector
3 measurements and said nominal selected vector measurement.

1 7. (Original) The method of claim 6, wherein said pre-determined analysis further
2 includes a root summed square analysis involving a sum of the square of said difference between
3 said respective selected vector measurements and said nominal selected vector measurement.

1 8. (Original) The method of claim 6, wherein said pre-determined analysis further
2 includes a extreme value analysis involving a determination of a maximum of said difference
3 between said respective selected vector measurements and said nominal selected vector
4 measurement when said circuit parameter values at their extreme tolerance values.

1 9. (Original) The method of claim 6, wherein said pre-determined analysis further
2 includes a worst case by sensitivity analysis involving a maximum of an absolute value of said
3 difference between said respective selected vector measurements and said nominal selected
4 vector measurement.

1 10. (Original) A computer readable medium having stored therein a simulation
2 template for modifying a SPICE netlist of a circuit design to perform a pre-determined analysis
3 involving parameter perturbations, comprising:

4 a routine to add to said netlist for altering circuit parameter values of said circuit design
5 in a pre-determined manner;

6 a routine to add to said netlist for performing simulations of said circuit design for
7 respective altered circuit parameter values to arrive at respective selected vector measurements;
8 and

9 a routine to add to said netlist for manipulating at least one of said vector measurements
10 in accordance with said pre-determined analysis.

1 11. (Original) The computer readable medium of claim 10, wherein said simulation
2 template further includes a command to add tolerances in the netlist for said circuit parameters.

1 12. (Original) The computer readable medium of claim 10, wherein said simulation
2 template further includes a command to remove parameter and vector save statements in said
3 netlist.

1 13. (Original) The computer readable medium to claim 10, wherein said simulation
2 template further includes a routine to add to said netlist for performing a reference simulation of
3 said netlist to arrive at a nominal value for said selected vector measurement.

1 14. (Original) The computer readable medium of claim 13, wherein said analysis
2 routine also manipulates said nominal selected vector measurement in accordance with said-pre-
3 determined analysis.

1 15. (Original) The computer readable medium of claim 14, wherein said pre-
2 determined analysis includes a sensitivity analysis involving determining a difference between
3 said respective selected vector measurements and said nominal selected vector measurement.

1 16. (Original) The computer readable medium claim 15, wherein said pre-determined
2 analysis further includes a root summed square analysis involving a sum of the square of said
3 difference between said respective selected vector measurements and said nominal selected
4 vector measurement.

1 17. (Original) The computer readable medium of claim 15, wherein said pre-
2 determined analysis further includes a extreme value analysis involving a determination of a
3 maximum of said difference between said respective selected vector measurements and said
4 nominal selected vector measurement when said circuit parameter values at their extreme
5 tolerance values.

1 18. (Original) The computer readable medium of claim 15, wherein said pre-
2 determined analysis further includes a worst case by sensitivity analysis involving a maximum of
3 an absolute value of said difference between said respective selected vector measurements and
4 said nominal selected vector measurement.

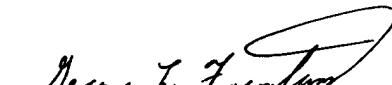
CONCLUSION

In view of the foregoing amendments and remarks, allowance of this patent application is respectfully requested.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

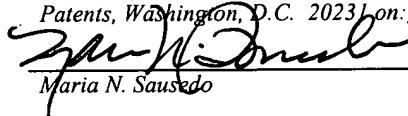
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on: April 14, 2003.


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4/14/03
Date